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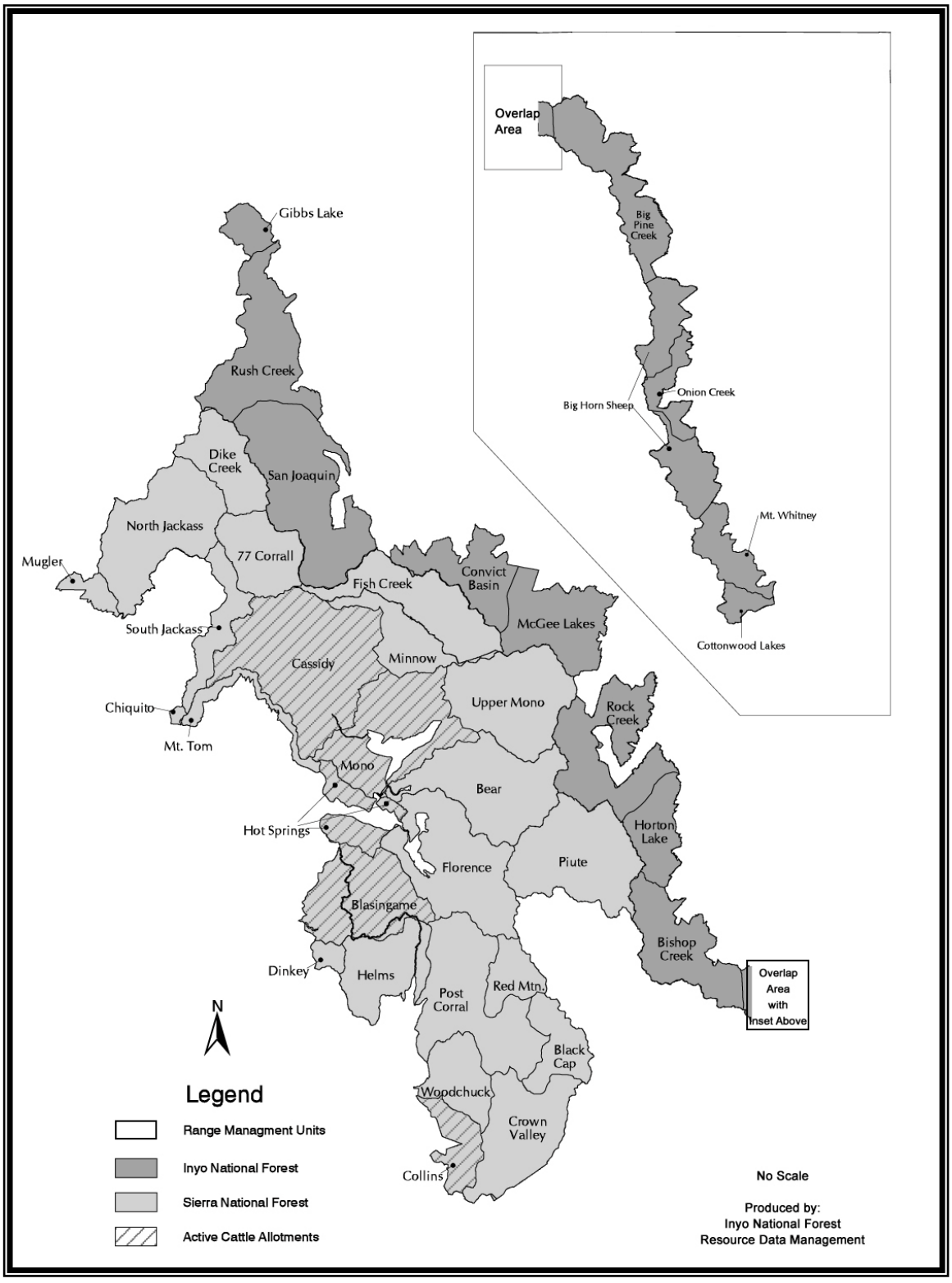
Figure E-1. Rangeland Management Units within Ansel Adams, John Muir and Dinkey Lakes Wilderness Areas



APPENDIX E

Rangeland Capability and Suitability Analysis

Introduction

The following narrative has been borrowed from *Framework for Conservation and Collaboration* (USDA Forest Service 2000*)* and adapted for this planning effort as it relates to transportation livestock. *Key adaptations or changes to the borrowed text are shown in italic*. The important distinction to keep in mind is that previous capability and suitability analyses done on these areas were based on the use of these rangelands by free roaming commercial livestock (cattle & sheep) as well as transportation livestock (horses & mules). Under current grazing, use these same rangelands are now being used by a variety of transportation livestock (packstock), including horses, mules, burros, llamas and goats. Packstock generally forage under very controlled "patch grazing" conditions, in close proximity to riding trails and camps (McClaran 1993).

Implementing National Forest Management Act regulations found in 36 CFR 219.20 require a determination of rangeland capability and suitability in Forest Plans. Also required is a determination of condition and trend of suitable rangelands. The following protocols include definition of terms, analysis and information needs, recommended criteria for consistent determinations, and advice for describing rangeland conditions in the planning record.

Definitions

Capability: "The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection, insects, and disease (CFR 219.3).

Suitability: "The appropriateness of applying certain resource management practices to a particular area of land as determined by an analysis of the economic and environmental consequences and alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices." (CFR 219.3).

Analysis and Needed Information for Determining Capable and Suitable Rangelands

The determination of capable and suitable rangelands is dependent upon the scope of grazing issues. Analysis is conducted at the level of planning where existing or reasonably attainable data is available for valid conclusions. Capability and suitability analysis at the Forest Plan level is generally not a decision to graze livestock on any specific area of land. Nor is it a conclusive

decision on livestock grazing capacities. The analysis is meant to show where grazing could occur if there is a decision to graze livestock. In some situations livestock need not be prohibited from areas not identified in the plan as capable or suitable (Acting Deputy Chief, McDougle, 1997). *For example, a remote stringer meadow with sufficient forage to support packstock but considerable distance from trails or camps may not be identified as capable and suitable in this analysis. However, if use of the meadow does not conflict with other resources, then the area would be available to graze with no restrictions on access. There would be no forage allocations made to packstock operators in these situations.*

Capability Determinations

Determination of rangeland capability and suitability is a two-step process. The first step determines which lands are *capable of being grazed*. Rangeland capability represents the biophysical determination of those areas of land that can sustain domestic grazing. Lands capable of being grazed will essentially remain the same in all of the Forest Plan alternatives and will be displayed (map(s) and tables showing capable and non-capable acres). Rangeland capability for revision or amendment of forest plans can be determined either through an aggregation of planning unit determinations or applying capability criteria at the forest scale, or a combination of the two. *For this analysis we have used a combination of criteria at the forest scale with aggregation of rangeland management units (see Table E-1).*

Suitability Determinations

The second step identifies which capable rangelands are *suitable for grazing under various management scenarios*. Assessment of suitability is conducted to address whether livestock grazing is compatible with other land uses, resource values, social and economic values. *Current suitable rangelands described in Table E-3 are based on (1) total capable meadow acres; (2) previous suitability maps and (3) existing forest closures for site-specific areas. Capable upland acres, which have not been inventoried or monitored, have not been used in either past or present suitability determinations. Suitability determinations will be adjusted during habitat assessments of Critical Aquatic Refuge areas and Yosemite Toad Habitats over a 3-year period as described in Sierra Nevada Forest Plan Amendment (2001). Also during NEPA analysis conducted at either the watershed or rangeland management unit (RMU) level as described in Appendix H. Schedule for Inventory, Planning, Monitoring and Implementation.*

Capability Criteria

Capability criteria as described in *The Framework* are intended for rangelands grazed by production livestock. That document notes that the determination of capability should be made considering all criteria rather than any one criterion alone. The following criteria were given which should be addressed as a minimum:

Slope -- Areas with less than or equal to thirty percent (30%) slope for cattle and horses; slopes less than or equal to 45 percent (45%) for sheep and goats. The degree of slope cannot be used as a single criterion for determining capable areas but is used in conjunction with other local factors.

Forage Production -- Areas producing more than or having the potential to produce an average of 200 pounds per acre per year on an air dry basis over the planning period.

Accessibility -- Areas accessible to livestock without such factors as rock or physical barriers.

Adaptations Made for the Wilderness Planning Area -- Using the above general criteria as a guide the following criteria were developed for use on National Forest System lands within the Wilderness Planning Area in relation to recreational packstock use by all classes of packstock including horses, mules, burros, llamas and goats.

1. All areas within a 300-foot distance of System Trails (600 foot wide band; off-centered 300 feet on each side) or within a 300-foot radius of inventoried packstock camps (600 foot diameter sphere) -and- with slopes less than or equal to thirty percent (30%). The following assumptions were made:

    a) This criterion allows for use of herbaceous vegetation found under forested canopies, along riparian corridors and open upland slopes characteristic of the canyon bottoms where most system trails are located.

    b) This criteria only considers Forest Service classified System Trails. All User Defined Trails would be excluded from this analysis since they are not readily inventoried on maps or have discernable levels of packstock travel.

    c) It is assumed that riders would avoid opportunities to graze packstock en route of travel while on trails crossing steep upland slopes or a series of trail “switchbacks.”

    d) It is assumed that packstock camps are generally located along gently sloped canyon bottoms, terraces or within lake basins.

Table E.1. Summary of Capable Meadows and Upland-Riparian in Year 2000

RMU	Total Acres	Lake Acres	Pvt. Acres	Capable Meadow Acres	Non-Capable Meadow	Total Meadow Acres	Capable Upland Acres	Non-Capable Upland	Total Upland Acres
Sierra NF									
77 Corral	17,937	23	38	52	33	85	1,283	16,508	17,791
Bear	34,950	803		220	212	432	2,614	31,101	33,715
Black Cap	12,712	362		40	46	86	907	11,357	12,264
Blasingame	28,896	233		1,030	490	1,520	3,328	23,815	27,143
Cassidy & Mt. Tom	61,715	186		273	113	386	4,154	56,989	61,143
Collins	10,280	54	21	178	105	283	1,213	8,709	9,922
Crown Valley	27,667	67	386	427	303	730	1,815	24,669	26,484
Dinkey & Helms	27,891	1,845	42	521	93	614	2,349	23,041	25,390
Fish Creek	26,041	653		57	5	62	2,300	23,026	25,326
Florence	39,017	1,155	273	364	296	660	1,824	35,105	36,929
Hot Springs	15,349	43		37	28	65	407	14,834	15,241
Minnow	13,983	389		270	1	271	1,586	11,737	13,323
Mono	37,293	5,019		713	188	901	3,514	27,859	31,373
Mugler	4,295	15		29	61	90	39	4,151	4,190
North Jackass	35,848	377		66	77	143	4,517	30,811	35,328
Piute	35,443	1,602		189	11	200	3,729	29,912	33,641
Post Corral	39,783	132	14	248	266	514	2,695	36,428	39,123
Red Mountain	9,539	285		79	47	126	1,125	8,003	9,128
Upper Mono	33,750	595		466	179	645	2,789	29,721	32,510
Woodchuck	14,908	205	87	214	36	250	1,410	12,956	14,366
Inyo NF									
Big Pine	39,973	316		215	186	401	1,011	38,245	39,256
Bishop Creek	24,444	822	50	446	466	912	2,605	20,055	22,660
Convict Basin	19,088	396		97	98	195	1,040	17,457	18,497
Cottonwood Lakes	6,570	182		387	114	501	648	5,239	5,887
Gibbs Lake	5,940	38		118	19	137	50	5,715	5,765
Horton Lake	13,373	63	42	61	67	128	416	12,724	13,140
McGee Lakes	26,136	277		398	135	533	2,300	23,026	25,326
Onion Creek	12,064	83	26	0	19	19	374	11,562	11,936
Rock Creek	31,511	433	74	848	297	1,145	1,555	28,304	29,859
Rush Creek	33,264	934		2,879	756	3,635	1,731	26,964	28,695
San Joaquin	45,964	1,064	658	1,812	423	2,235	7,675	34,332	42,007
Bighorn Sheep	35,338	119	0	62	169	231	775	34,213	34,988
Mt. Whitney	17,497	no data	no data	no data	no data	no data	no data	no data	no data
Total	***838,459***	***18,770***	***1,711***	***12,796***	***5,339***	***18,135***	***63,778***	***718,568***	***782,346***

2. All meadows identified from aerial photography and in relatively close proximity (within 0.25 miles) to System Trails or inventoried packstock camps. The following assumptions were made:

   a) Accessible meadows near System Trails would likely receive repeated use.

   b) Isolated meadow away from System Trails would be unlikely to receive repeated use.

   c) Meadows found in large basins or on gentle slopes less than or equal to 30 percent, would receive occasional use from cross-country travelers.

Table E.2. Restricted Packer Use Areas by Forest Closures in Year 2000

Rangeland Management Unit	Meadow Closure Areas	Meadow Acres	Riparian & Upland Acres	Reason for Closure
Sierra NF				
Bear Creek	Hilgard Branch	36	368	Λ, λ
Bear Creek	Rosemarie	14	6	Λ, λ
Crown Valley	Crown Lake	23	0	λ
Crown Valley	Crown Admin Site	6	0	Σ
Dinkey & Helms	Dinkey Lakes	133	300	λ, Θ, X
Fish Creek	Cascade Valley	0	415	λ, μ, X,
Minnow Creek	Cascade Valley	0	107	λ, μ, X,
Upper Mono	Pioneer Basin	119	700	μ, λ, ω
Post Corral	Big Maxson Admin Site	4	0	Σ, λ
Inyo NF				
Mount Whitney	Shepard Pass & Mt. Whitney Trail	No data	No data	Θ

μ = Unsatisfactory meadow conditions, packstock allowed, no grazing allowed
Λ = Unsatisfactory meadow conditions, packstock allowed, limited grazing, alternate year closures
X = Congested camping area, packstock allowed, no grazing allowed
Θ = High use recreation area & public safety, no packstock allowed
Σ = Forest Service administrative site, no public packstock allowed
ω = Sensitive wildlife, fisheries or plant habitats, no packstock allowed
λ = lake shore, streamside or watershed protection

Table E.3. Suitable Rangeland Acres by Rangeland Management Unit

Rangeland Mgt. Unit	Total Acres	Lake Acres	Pvt Acres	Meadow Capable Acres	Closed Acres	Suitable Acres	Upland Capable Acres	Closed Acres	Suitable Acres
Sierra NF									
77 Corral	17,937	23	38	52	0	52	1,283	0	1,283
Bear	34,950	803		220	50	170	2,614	374	2,240
Black Cap	12,712	362		40	0	40	907	0	907
Blasingame	28,896	233		1,030	0	1,030	3,328	0	3,328
Cassidy & Mt. Tom	61,715	186		273	0	273	4,154	0	4,154
Collins	10,280	54	21	178	0	178	1,213	0	1,213
Crown Valley	27,667	67	386	427	29	398	1,815	0	1,815
Dinkey & Helms	27,891	1,845	42	521	133	388	2,349	300	2,049
Fish Creek	26,041	653		57	0	57	2,300	415	1,885
Florence	39,017	1,155	273	364	0	364	1,824	0	1,824
Hot Springs	15,349	43		37	0	37	407	0	407
Minnow	13,983	389		270	0	270	1,586	107	1,479
Mono	37,293	5,019		713	0	713	3,514	0	3,514
Mugler	4,295	15		29	0	29	39	0	39
North Jackass	35,848	377		66	0	66	4,517	0	4,517
Piute	35,443	1,602		189	0	189	3,729	0	3,729
Post Corral	39,783	132	14	248	4	244	2,695	0	2,695
Red Mountain	9,539	285		79	0	79	1,125	0	1,125
Upper Mono	33,750	595		466	119	347	2,789	700	2,089
Woodchuck	14,908	205	87	214	0	214	1,410	0	1,410
Inyo									
Big Pine	39,973	316		215	0	215	1,011	0	1,011
Bishop Creek	24,444	822	50	446	0	446	2,605	0	2,605
Convict Basin	19,088	396		97	0	97	1,040	0	1,040
Cottonwood Lakes	6,570	182		387	0	387	648	0	648
Gibbs Lake	5,940	38		118	0	118	50	0	50
Horton Lake	13,373	63	42	61	0	61	416	0	416
McGee Lakes	26,136	277		398	0	398	2,300	0	2,300
Onion Creek	12,064	83	26	0	0	0	374	0	374
Rock Creek	31,511	433	74	848	0	848	1,555	0	1,555
Rush Creek	33,264	934		2,879	0	2,879	1,731	0	1,731
San Joaquin	45,964	1,064	658	1,812	0	1,812	7,675	0	7,675
Bighorn Sheep Area	35,338	119	0	62	0	62	775	0	775
Mt. Whitney	17,497	no data	no data	no data	no data	No data	no data	no data	no data
Totals	***838,459***	***18,770***	***1,711***	***12,796***	***335***	***12,461***	***63,778***	***1,896***	***61,882***

Protocol for Application of Capability Criteria Using Geographic Information System Analysis

(Heather Taylor, North Zone GIS Coordinator, Sierra NF)

Geographic Information Systems (GIS) analysis is being used to determine capable rangelands for packstock across the wilderness planning area. The procedures described here are subject to change as more detailed information is obtained for the rangeland resources. The intent for this modeling exercise is to identify geographic areas where packstock grazing is probable. Figure E.2 shows the results of one such analysis.

Summary: This procedure takes wilderness trails and packer camps, buffers them to predetermined distances, combines these two coverages and attaches slope information to this new buffer coverage. Polygons with slopes of are selected and put to a new coverage. In ArcView, the less than or equal to 30 percent buffer coverage and a meadow coverage are displayed and the whole area of any meadows intersecting with the buffer coverage are chosen and converted to a shapefile, then an Arc coverage. These meadows are erased out of the full buffer coverage, as are lakes and private land. Acres are calculated for both the new meadow coverage and the buffer/slope coverage with erased meadows, lakes and private land. GIS Programs utilized were ARC Version 7.2.1 and ArcView Version 3.1.

Figure E.2. Rangeland Capability Analysis. Cottonwood Lakes Rangeland Management Unit.